

# IDAHO STATE POLICE



## Toxicology Program Trends 2014

# 2014 IDAHO STATE POLICE FORENSIC SERVICES: TOXICOLOGY TRENDS

## Overview and Background

This report discusses trends in the toxicology program, as well as the number of toxicology cases submitted to the following Idaho State Police Forensic Services (ISPFS) laboratories for the fiscal year 2014 (FY2014): District 1, Coeur d' Alene; District 5, Pocatello; and District 3, Meridian (blood alcohol only). A "toxicology case" is any case which has urine or blood submitted to the laboratory for qualitative drug analysis and/or volatiles analysis; volatiles analysis may also be performed on vitreous humor samples. Volatiles analysis quantitates ethyl alcohol (drinking alcohol) and detects a wide range of other alcohols or inhalants. Toxicology analysis falls under three major disciplines: alcohol (the level of alcohol in blood, urine, vitreous humor, or unknown liquids), blood toxicology (drugs in blood) and urine toxicology (drugs in urine).

A case may have multiple items submitted for analysis (e.g. blood and urine samples taken from both drivers in a two car auto accident account for one case with four items). The case counts in the Toxicology Tracking Information table do not account for multiple items in one case; this total also applies to any items not analyzed (e.g. insufficient sample for analysis). The results discussions in the Alcohol and Toxicology sections of the report are based solely on actual items tested – so if there are multiple items in a case, each item is accounted for in the results discussion. The Alcohol and Toxicology sections do not account for any items not analyzed.

These statistics were compiled from both the Idaho Evidence Tracking System (IETS) and the Idaho Laboratory Information Management System (ILIMS), which were used to log in and track all evidence submitted to the forensic laboratory system during FY2014. ISPFS has now fully transitioned to using ILIMS for casework, and this Trends Report is the only report that will compile statistics from both databases. All case information is provided by the submitting agencies to the laboratory.

One clarification for the Program Trends report is that reports from previous years did not strictly define "juvenile." It is likely that "juvenile" in previous reports was defined as under age 18. For the purposes of this and all subsequent years, "juvenile" refers to any subject under age 18 as of the incident date, except for alcohol analyses. Subjects under age 21 as of the incident date are considered juveniles for alcohol analysis statistics. This clarification to the "juvenile" definition for alcohol statistics is based on the per se level of 0.02 g% for persons under age 21.

Alcohol statistics for this year's report are expressed in g% units, as not all cases analyzed were blood. The g% unit includes blood (g/100cc blood), urine (g/67mL urine), and vitreous humor (g/100cc vitreous humor). Any liquid alcohol samples have been excluded from the statistical analysis presented here.

## Toxicology Tracking Information

	Blood Toxicology	Alcohol/Volatiles	Urine Toxicology	Total	FY2014 Percent
<b>DUI</b>					
Adult	558	1041	357	1956	<b>77.46%</b>
Juvenile	8	59	4	71	
<b>Probation Violations*</b>					
Adult	0	1	26	27	<b>1.95%</b>
Juvenile	0	2	22	24	
<b>Drug/Narcotic Violations**</b>	43	25	58	126	<b>4.81%</b>
<b>Other***</b>	35	34	29	98	<b>3.74%</b>
<b>Auto Accident Fatalities</b>	70	70	10	150	<b>5.73%</b>
<b>Accident Victim Kits</b>	1	16	0	17	<b>0.65%</b>
<b>Death (non-homicide)</b>	26	39	7	72	<b>2.75%</b>
<b>Murder</b>	5	5	2	12	<b>0.46%</b>
<b>Rape</b>	14	17	33	64	<b>2.45%</b>
<b>NJDT</b>	0	0	0	0	<b>0%</b>
Total:	<b>760</b>	<b>1309</b>	<b>548</b>	<b>2617</b>	<b>100.00%</b>

**Table 1:** Statistics were compiled from the Idaho Evidence Tracking System (IETS) and Idaho Laboratory Information Management System (ILIMS) which were both used to log in and track all evidence submitted to the forensic laboratory system during FY2014. The ILIMS system allows for agencies to enter multiple charges instead of forcing the agencies to list only the highest charge. Many cases with a drug charge were also DUI cases. Any cases in which a date of birth (DOB) was not provided are classified as "adult" to prevent significant statistical changes to the juvenile category.

\*Includes Juvenile, Misdemeanor, and Felony; \*\*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering; \*\*\*Includes Arson, Aggravated Assault/Battery, Officer Involved Shooting, Injury Accidents, Injury to Child, Under the Influence in Public, Leaving the Scene, Manslaughter/Vehicular Manslaughter

### Terms and Drug Categories

Central Nervous System Depressants (CNS-D), Central Nervous System Stimulants (CNS- S), and carboxy-THC (THC) account for most of the positive toxicology results obtained from analysis. The report appendix includes term definitions, drug category descriptions, and examples of drugs included in each category.

Carboxy-THC is an inactive metabolite of marijuana (MJ). After ingestion, MJ is broken down in the body to a form that the body can eliminate as waste. There are many MJ metabolites, and carboxy-THC is one

of them. ISPFS current methods for extracting MJ from blood and urine will extract this metabolite. ISPFS is currently working to develop a method which will allow the lab to quantify the active component of MJ (delta9-THC) and its metabolites in blood. It is expected that the toxicology discipline caseload will increase significantly once ISPFS has quantitative methods validated for use in casework. It has been expressed to ISPFS personnel that coroners especially require quantitative results for meaningful interpretation of toxicology results in death investigations. Also, prosecutors have expressed an increasing desire for quantitative results in prosecuting criminal cases.

Driving under the influence of impairing prescription drugs is an increasing problem in Idaho. Some of the most impairing drugs fall under the CNS-D category of drugs. Drugs that exhibit CNS-D effects are found in a wide range of therapeutic categories: anti-depressant, anti-anxiety, anti-histamine, barbiturate, narcotic analgesic (NA), and others.

- **Narcotic**--*a drug that in moderate doses dulls the senses, relieves pain, and induces profound sleep but in excessive doses causes stupor, coma, or convulsions.*
- **Analgesic**--*relives pain.*

Some of the most commonly confirmed narcotic analgesics in Idaho DUI cases are hydrocodone, oxycodone, and methadone.

The benzodiazepine class drugs are anti-anxiety or tranquilizers; the most commonly found benzodiazepines in casework were alprazolam, diazepam, lorazepam, and nordiazepam.

The laboratory tracks cases with positive inhalant results. Investigators suspect inhalation of paint or air duster in most of these cases. 1,1-difluoroethane (DFE) is the compound found from air duster inhalation; acetone and toluene are volatiles found from canned paint inhalation.

Highly impairing CNS-S drugs such as methamphetamine and cocaine are usually not distributed in prescription form. Amphetamine can be obtained as a prescription, but is most commonly seen as an active metabolite of methamphetamine. Methamphetamine is reduced to amphetamine after ingestion, and is excreted partly as amphetamine. Once broken down into amphetamine, the amphetamine acts as its own drug (i.e. it is an active metabolite), and produces stimulant effects aside from those produced by methamphetamine. ISPFS laboratory analysis yields relatively few positive results for cocaine. This does not necessarily mean cocaine is not being abused in Idaho. Cocaine is eliminated from the body very rapidly. If a significant amount of time passes between use and sample collection, cocaine may not be detected. However, the inactive cocaine metabolite, benzoylecgonine, has a longer detection window. This means that toxicology results can support allegations of cocaine use, even if no active drug is detected in the sample.

ISPFS lists drug combinations in each of the drug toxicology categories because drug combinations can cause *additive* or *synergistic* effects. Hydrocodone (Vicodin) used in conjunction with carisoprodol (Soma) has greater impairing effects than either drug used alone. An anti-depressant taken alone in

therapeutic amounts (prescribed quantities) may not have any impairing effects, but taken in conjunction with other CNS-Ds (e.g. alcohol or other anti-depressants) may display additive effects (i.e. 1 + 1 = 2). Some drugs produce synergistic effects. *Synergistic* means that the drug combination may cause effects much greater than either drug alone (i.e. 1 + 1 = 5). A common example of this would be the mixture of codeine and acetaminophen for the relief of moderate pain. Taken separately either of these substances will provide relief for a lesser amount of pain, but when taken together the synergistic reaction between the two drugs allows for a greater amount of pain relief than if the drugs were taken separately.

A negative sample result in one discipline (i.e. alcohol, blood toxicology, or urine toxicology) only reflects the testing performed in that discipline; the sample may have a positive result from testing in another discipline. For example, a case may have a negative alcohol result, but a positive result for drugs. ISPFS laboratory policy is not to process a sample for toxicology if the blood alcohol result is above 0.10 g%. In special circumstances, such as sexual assault or death investigations, injury to a child, or possible overdose cases, the toxicology may still be analyzed even if the blood alcohol is above 0.10 g%. An ISPFS policy change in 2013 required performance of requested toxicology analyses on samples from deceased drivers in fatality accidents when the alcohol level is below 0.20 g% of blood.

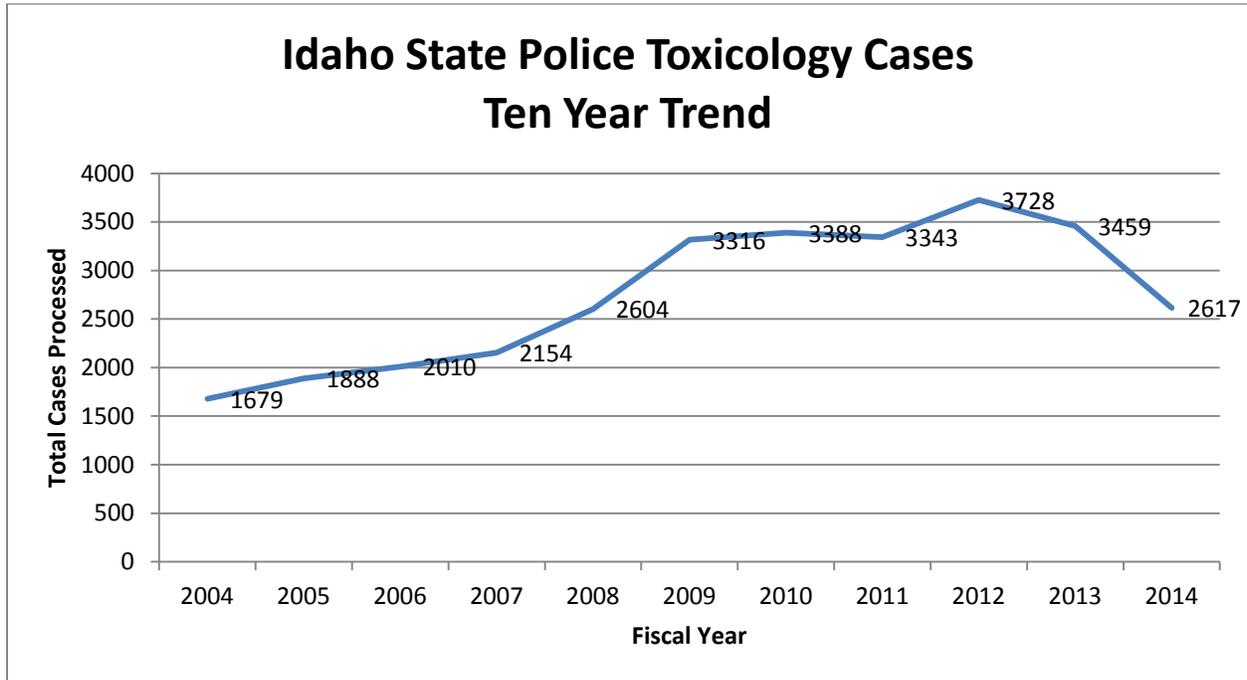
## Toxicology Discipline FY2014

The ISPFS laboratory system received 2,617 toxicology cases for FY2014, a decrease of 842 cases from FY2013. The large decrease in the number of cases was primarily for alcohol submissions, and should be greatly attributed to the *Missouri v. McNeely* decision, which essentially negated implied consent. Most Idaho officers have been advised to obtain a warrant to obtain an evidentiary blood sample, with rare exceptions. The caseload decrease observed might also be due to ISPFS toxicology analysis limitations, particularly in the area of drug quantitation. Many prosecutors are determining that quantitation of the drugs in toxicology samples is necessary for prosecuting cases; ISPFS is currently only able to provide qualitative identification of the drugs in samples, with the exception of ethyl alcohol. This means that ISPFS can identify which drugs are present, but not how much of the drug is present.

Topics covered in this report include:

<b>Alcohol and Other Volatiles</b>	Adult and Juvenile Trends
	Fatality Accidents
	Other Offenses
<b>Toxicology</b>	Adult and Juvenile Trends
	DUI Related Trends
	Other Offenses

**Figure 1** contains a line graph of the total yearly toxicology submissions for the last ten years. Multiple items for a single case are often submitted, but are not accounted for in the totals. Samples may be counted twice because an alcohol sample may also be processed for toxicology. The average number of cases submitted to ISPFS for the last 5 years is 3300 cases.



**FIGURE 1 – Toxicology Caseload 10-Year Trend**

## Alcohol and Other Volatiles

The number of alcohol case submissions to ISPFS decreased by 774 cases from FY2013 to FY2014. A possible explanation for this trend is forced blood draw constitutionality concerns (*Missouri v. McNeely*). Once the legal decision over forced blood draws was rendered, case submissions began to slowly resume; submissions have not returned to normal submission levels. ISPFS provides support for breath testing in Idaho; the scientists working in this discipline have reported a significant increase in breath testing workload. It is likely that officers are opting to perform breath tests rather than obtain warrants, except in cases where drugs other than alcohol are also suspected.

Alcohol analysis requests span a wide range of case types: DUI, rape, accident, death investigation, and other offense cases. The alcohol result category levels are: none detected/ below reportable limit

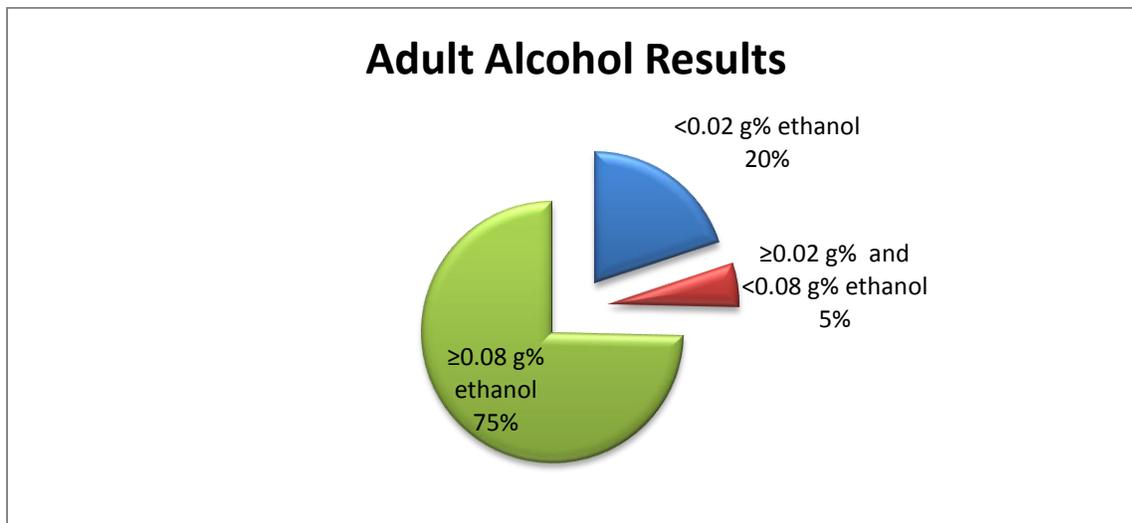
(<0.02 g%), ≥0.02 g% and <0.08 g%, and ≥0.08 g%. Many inhalants and other volatiles can be detected when alcohol analysis is performed.

**Adult Alcohol Concentrations**

This section’s statistics are based not on a total number of cases, but on total alcohol results. This may result in different numbers than the previous table, as some cases have multiple items and others were not analyzed. ISPFS processed 1203 adult samples for alcohol and inhalants during FY2014. The analysis results are tabulated below. Each sample for which alcohol analysis is requested is simultaneously tested for the presence of inhalants. Of the 1203 adult alcohol samples, 24 were urines and 2 were vitreous humor.

Number of Adult Samples	Result Category
5 (not included in total)	Not analyzed
240	<0.02 g%
65	≥0.02 g% and <0.08 g%
898	≥0.08 g%
1203 (Total)	

For the purposes of this report, any alcohol result that was reported as “none detected” or “below reportable limit” is categorized as <0.02 g%. The 240 samples with a result of <0.02 g% are 77 less than the same result category for FY2013. If alcohol and toxicology testing are both requested, then a negative alcohol sample is also processed for drugs. Samples may be positive for drugs other than alcohol. **Figure 2** is a depiction of the overall adult alcohol results for FY2014; this chart includes DUIs, death investigations, auto accident fatalities, and a wide variety of other case types.



**FIGURE 2 – Adult Alcohol Levels for FY2014**

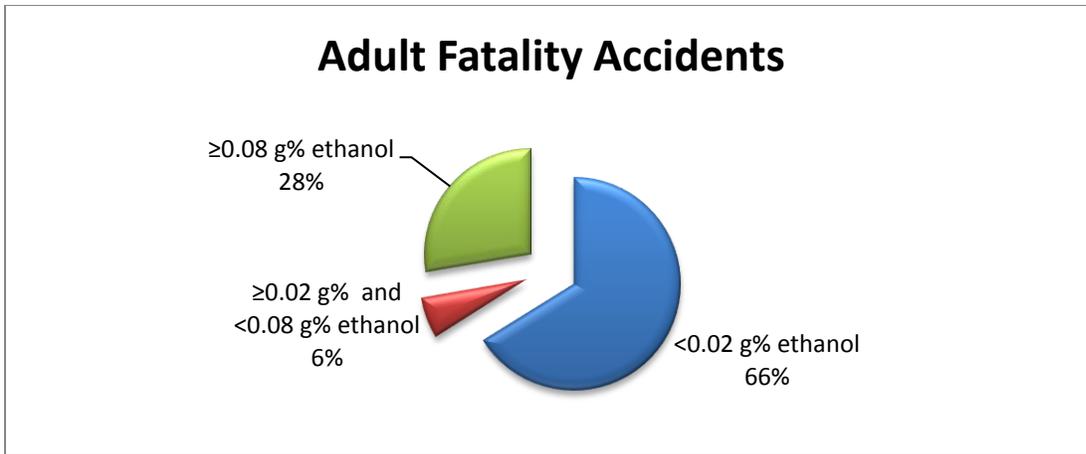
Eighteen adult samples tested positive for inhalants. Adults tested positive for inhalants over 3.5 times more frequently than juveniles, as only five juvenile samples were positive for inhalants. The adult population appears more likely to use inhalants. Considering the 1203 adult alcohol samples submitted, 18 positive inhalant samples is not a significant percentage. The inhalants used in the 18 positive samples include:

- 5 samples positive for difluorethane (air duster)
- 8 samples positive for acetone
- 2 sample positive for toluene (spray paint)
- 3 sample positive for isopropanol (rubbing alcohol)

Adult samples submitted for **pending DUI charges** constituted 1012 of the total 1203 (84%). Of these 1012 samples, 836 were over the per se limit of 0.08 g% (82.6%). If alcohol and toxicology were both requested on submission, any sample with alcohol results below 0.10 g% was automatically forwarded for drug testing. ISPFS also provides toxicology analysis for those cases where the alcohol level is  $\geq 0.10$  g% if there are extenuating circumstances. Extenuating circumstances can include sexual assault or death investigations, injury to a child, or aggravated offenses.

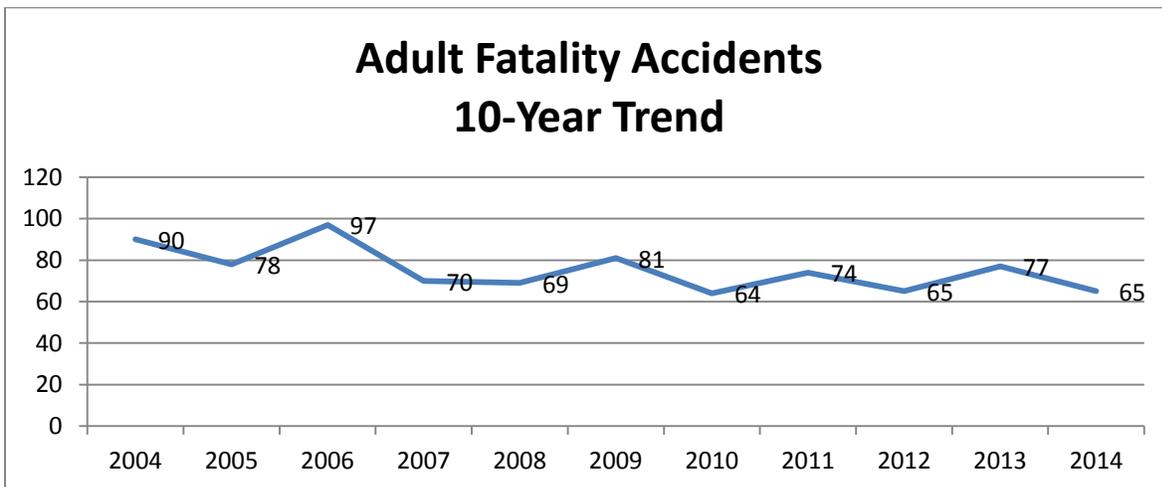
When urine samples are submitted for inhalant testing, they undergo simultaneous alcohol testing as it is the same test. Urine alcohol results are of questionable value, and are reported by ISPFS with a disclaimer statement. The questionable value of these results is based on several reasons. First, bacteria and yeast can grow in the urine. Bacteria and yeast can be common in urine samples and produce alcohol. Second, urine collection procedures are critical for meaningful interpretation of results. The urine needs to be voided, and then a 15 minute wait period observed before a fresh urine sample is collected for alcohol analysis. ISPFS discourages the use of urine for alcohol analysis due to the questionable value of results (IDAPA 11.03.01), but urine samples are occasionally submitted for alcohol and/or inhalants analysis.

One category of particular interest is **adult auto accident fatalities**. A total of 65 adult auto accident fatality case samples were submitted to ISPFS in FY2014; this is a decrease of 12 cases as compared to FY2013. Of the 65 cases, 66% contained  $< 0.02$  g% alcohol, but 28% were at or above the legal limit of 0.08 g%. One fatality accident case contained isopropanol (rubbing alcohol), and one contained acetone. It is possible to find acetone in a sample from various sources; one example is production in the body during ketoacidosis (caused by diabetes). **Figure 3** shows the BAC results for the adult auto accident fatalities.



**FIGURE 3 – Results for Adult Fatality Accidents**

**Figure 4** depicts the ten year trend of adult auto accident fatality cases submitted to ISPFS. The ten year average of 75 submissions is relatively stable. Law enforcement efforts, including their increased presence on Idaho roads, have helped to keep these cases from rising significantly. One particularly good example of inter-department cooperation in this public safety effort is the Idaho Department of Transportation (IDT) contributing funds to increase trooper saturation on the highways during high-risk time periods (i.e. holiday weekends).

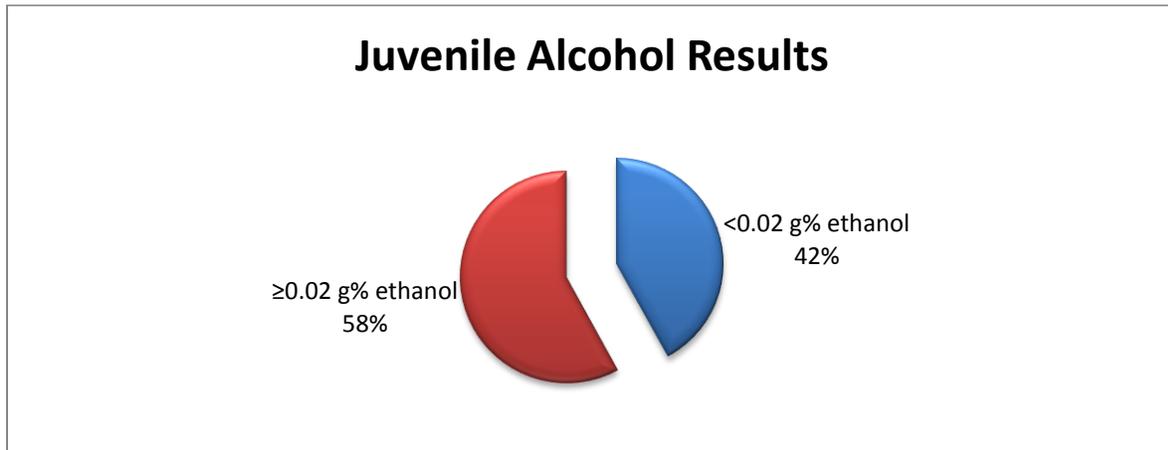


**Figure 4 – Ten Year Adult Fatality Accident Trend**

### Juvenile Alcohol Concentrations

ISPFS processed 100 juvenile BAC cases in FY2014. Of these samples, 58% were over the legal limit for persons under age 21 (0.02 g%). The number of samples submitted and the number of alcohol-positive

results decreased in FY2014. Of the 100 juvenile alcohol samples submitted to ISPFS, 70 were **juvenile DUI cases**; 58% of these cases were over the juvenile (under age 21) legal limit of 0.02 g%. In FY2013, there were 107 total cases submitted for testing on juvenile DUI cases. In FY2014, 53 juvenile DUI cases tested positive for alcohol; this represents a 3% decrease as compared to FY2013. **Figure 5** displays the overall juvenile case results; these results include DUIs, accident fatalities, and various other case types.



**FIGURE 5 – Juvenile Alcohol Results**

Inhalants were not found in the same abundance in juvenile samples as they were in the adult samples. Four DUI samples tested positive for difluoroethane (air duster). FY2013 had one positive result for difluoroethane in a juvenile sample. Inhalants are volatiles and evaporate easily. Inhalants do not stay in the blood or urine in detectable amounts for long periods of time, so the laboratory results may not be indicative of the prevalence of use.

Juvenile alcohol samples submitted in **fatality cases** decreased by 5 from FY2013 (16 cases) to FY2014 (11 cases). Half of the FY2014 juvenile fatality cases had an alcohol result above the per se 0.02 g%.

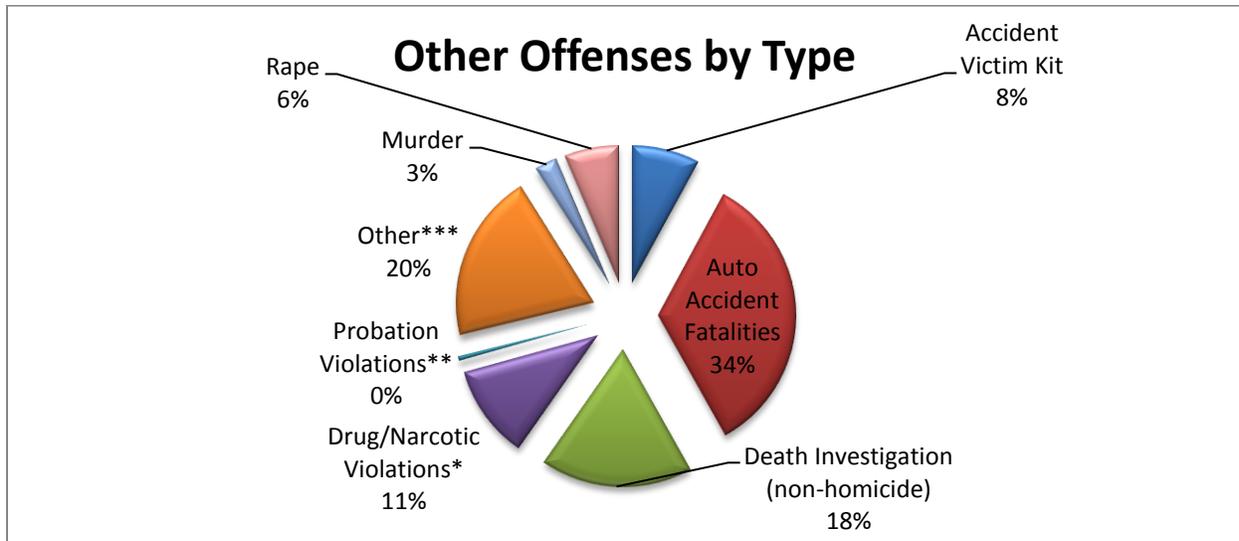
**Figure 6** is trend chart to show the juvenile auto accident fatality cases submitted over the last 10 years.



**Figure 6 – Ten Year Juvenile Fatality Accident Trend**

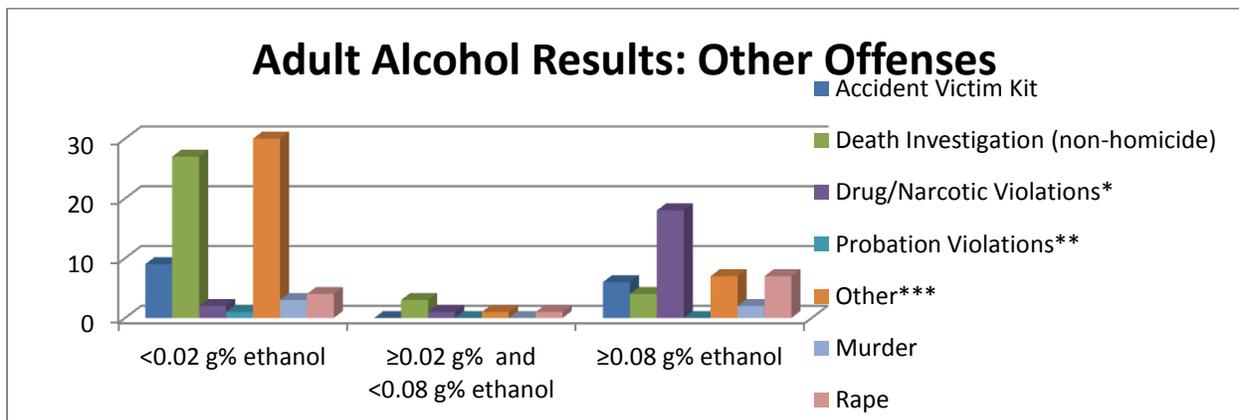
**Other Offense Alcohol Concentrations**

Cases submitted for alcohol analysis in FY2014 also included several other offenses. **Figure 7** is a graphic depiction of other offenses for which samples were submitted for alcohol analysis. **Figures 8 and 9** are depictions the results breakdowns for these other offenses for adults and juveniles, respectively. Death investigations (non-homicide) can be suicides, unattended deaths, or any other death that is deemed non-criminal. Many of the cases listed with negative or low alcohol concentrations may have a positive result for other drugs in the toxicology section of this report.



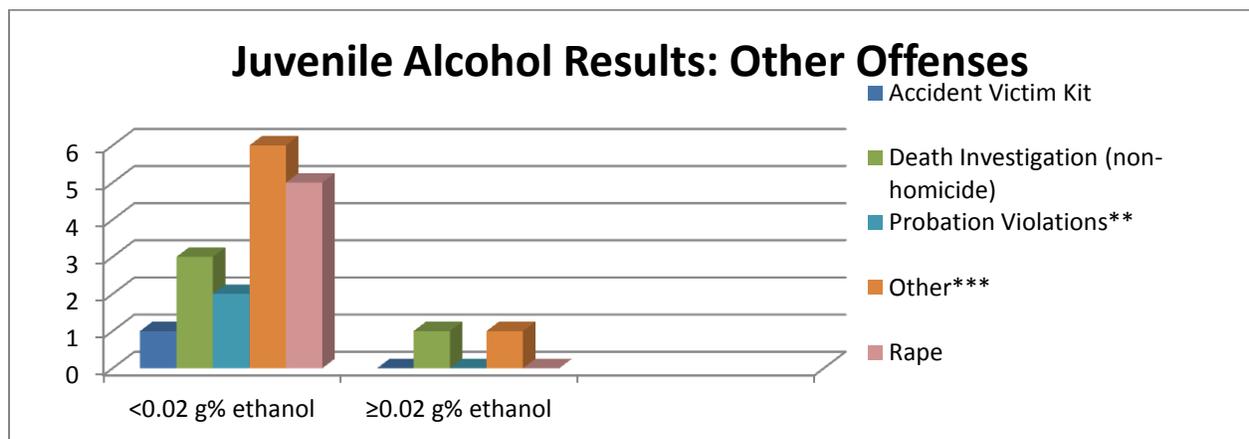
**Figure 7 – Alcohol Analysis Requests by Other Offense Types**

\*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering; \*\*Includes Juvenile, Misdemeanor, and Felony; \*\*\*Includes Arson, Aggravated Assault/Battery, Officer Involved Shooting, Injury Accidents, Injury to Child, Under the Influence in Public, Leaving the Scene, Manslaughter/Vehicular Manslaughter



**Figure 8 – Adult Alcohol Results for Other Offenses**

\*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering; \*\*Includes Juvenile, Misdemeanor, and Felony; \*\*\*Includes Arson, Aggravated Assault/Battery, Officer Involved Shooting, Injury Accidents, Injury to Child, Under the Influence in Public, Leaving the Scene, Manslaughter/Vehicular Manslaughter



**Figure 9 – Juvenile Alcohol Results for Other Offenses**

\*\*Includes Juvenile, Misdemeanor, and Felony; \*\*\*Includes Arson, Aggravated Assault/Battery, Officer Involved Shooting, Injury Accidents, Injury to Child, Under the Influence in Public, Leaving the Scene, Manslaughter/Vehicular Manslaughter

It should also be noted that ISPFS annually provides each analyst one proficiency test in each discipline in which s/he is certified. The successful completion of this annual test is required for analysts to be permitted to continue to perform analyses on casework. The proficiency test statistics are not applicable to this report, and therefore not included.

## Toxicology (Drugs in Blood and Urine)

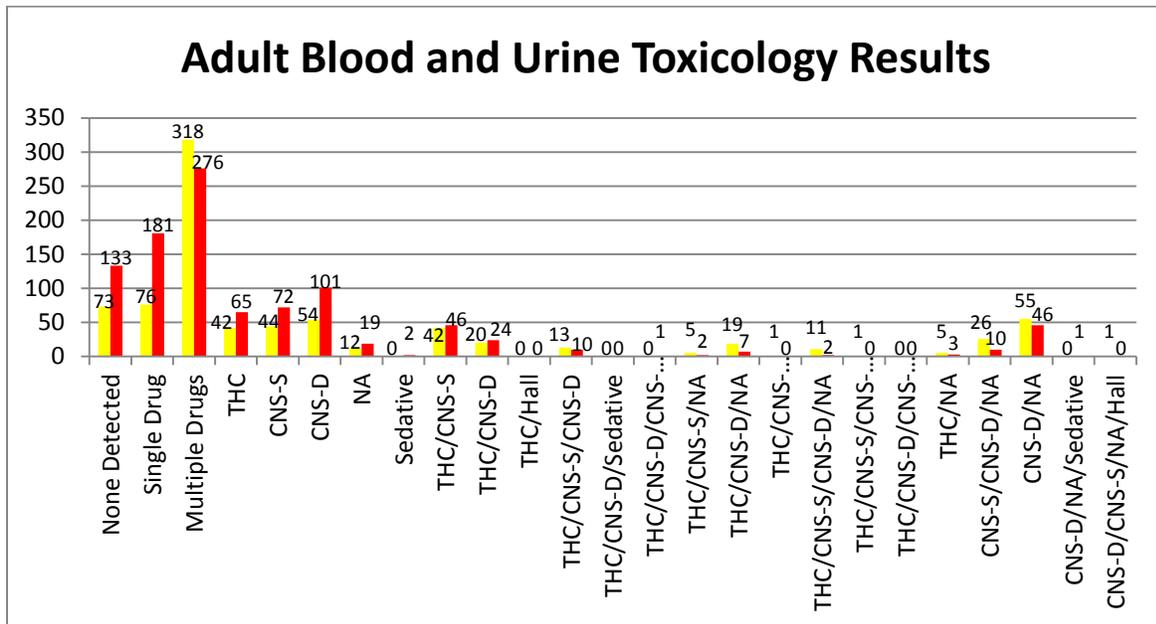
The difference between the blood and urine matrices submitted for testing drugs (toxicology) depends on many things: pH, methods of analysis, drug metabolism, and many others. Based on this knowledge, some drugs may be found in one matrix and not the other. For instance, carboxy-THC may be found in urine many days after use, but not in blood. If carboxy-THC is found in the blood, it may be indicative of more recent use. The type of fluid sample sent for toxicology analysis may depend on legal considerations. Blood is a better sample for alcohol, and can easily be retained for toxicology testing. Blood is often the preferred sample for toxicology because it gives the best indicator for possible impairment, and blood is usually obtained for legal purposes. Urine is filtered by the kidneys and is a much cleaner matrix; urine allows faster extractions of drugs. Further, urine pools in the bladder and often provides a greater concentration of drug than in blood. Obtaining a urine sample is not an invasive procedure, whereas a blood sample collection is invasive; also, it is usually possible to obtain a much larger volume of urine than blood. Blood is the preferred sample for purposes where current impairment is in question, so urine is often not collected. The blood and urine results cannot be directly

compared against each other, but using both blood and urine methods allows for more diverse and comprehensive analysis. It also allows for more accurate interpretation of results.

ISPFS toxicology policy states that samples with a result over a set amount of alcohol will not be tested for toxicology unless extenuating circumstances are present. ISPFS accepted 760 blood samples and 548 urine samples for toxicology testing in FY2014. There was a decrease of 29 blood toxicology samples submitted to the laboratory system between FY2013 and FY2014, and a decrease of 39 urine toxicology samples submitted during the same period.

**Adult**

All toxicology graphs use red for blood, yellow for urine. **Figure 10** shows the adult blood and urine toxicology results for FY2014 by therapeutic category. For example, hallucinogens (Hall) might be ecstasy (MDMA); narcotic analgesics (NA) might be the drugs morphine or hydrocodone.



**FIGURE 10 – Adult Blood and Urine Toxicology Results by Category**

The data for adult blood and urine samples show some interesting differences. For instance, blood analysis data indicates single drug use is more prevalent than drug combinations. Urine analysis shows the opposite indication. Some samples were not analyzed; this data is not included in the graphs. Some reasons for a sample not being analyzed might be insufficient sample or a sample not being suitable for analysis. Many of the blood samples submitted had a request for both alcohol and toxicology testing. When the alcohol result is 0.10 g% or higher, the blood sample and urine sample (if present for the same case) is returned without toxicology testing in most cases.

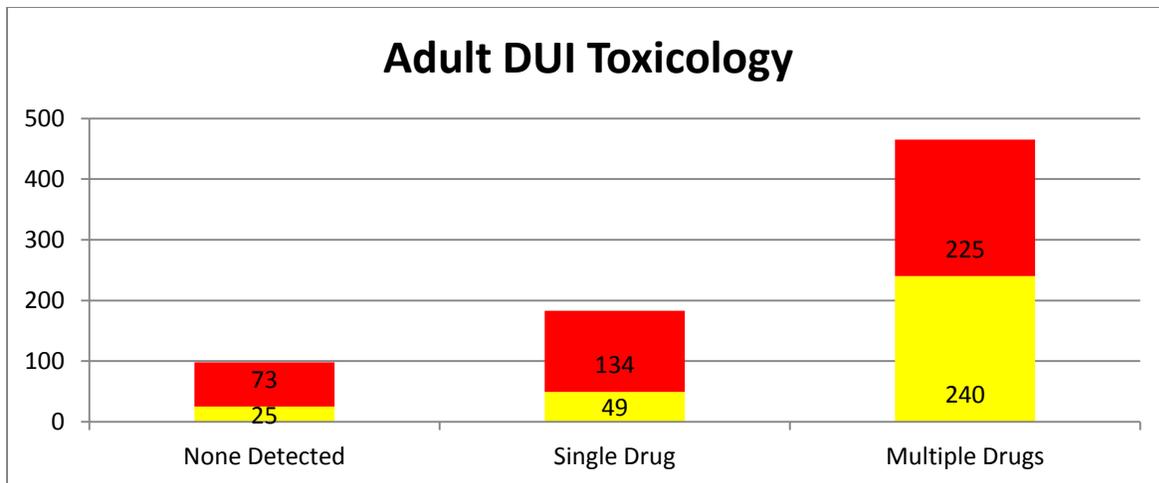
It is common in Idaho for the **most common single drugs** present in both adult urine and blood matrices to be a central nervous system depressant (CNS-D), followed by a central nervous system stimulant (CNS-S), and then carboxy-THC. CNS-Ds can be many drugs; examples include Valium, Xanax, and Ambien. CNS-Ss include drugs like Ritalin, Adderall, and methamphetamine. Carboxy-THC is commonly the metabolite of either MJ or the prescription drug Dronabinol.

Data from FY2014 indicates the **most prevalent drug combination** in urine is CNS-D and a narcotic analgesic (NA), followed by carboxy-THC/CNS-S. This is reversed for blood. The drug combination of CNS-D/NA is often prescribed together (e.g. muscle relaxers and pain killers). Alprazolam (anti-anxiety /tranquilizer), citalopram (anti-depressant) and diphenhydramine (OTC cold medicine/ motion sickness medication) are the most prevalent CNS-D's found, followed by meprobamate (active metabolite of the muscle relaxer Carisoprodol) and zolpidem (sleeping pill). Other popular CNS-D's are lorazepam, diazepam, and trazodone. Hydrocodone is by far the most commonly found narcotic analgesic. Narcotic analgesics and benzodiazepine-class compounds (e.g. alprazolam) are widely abused and addictive.

The most common CNS-Ss are methamphetamine and amphetamine. CNS-Ss also include cocaine and phentermine (commonly prescribed for weight loss). If methamphetamine is present in a urine or blood sample, amphetamine will likely be present as well. Amphetamine is an active metabolite of methamphetamine; it is impossible to determine whether any confirmed amphetamine in a sample is a result of prescription or illicit drug use. Amphetamine is available as prescription Adderall<sup>®</sup>. The metabolite amphetamine is less abundant in blood samples because the methamphetamine may not have metabolized completely. A urine sample will have amphetamine present in almost all cases where methamphetamine is present because of increased time in the body for metabolism of the methamphetamine to amphetamine.

The final breakdown of the adult drug results is as follows: 1,109 samples tested for adult toxicology (blood and urine). 233 total samples for blood and urine were negative, 267 samples contained a single drug, and 609 samples contained multiple drugs.

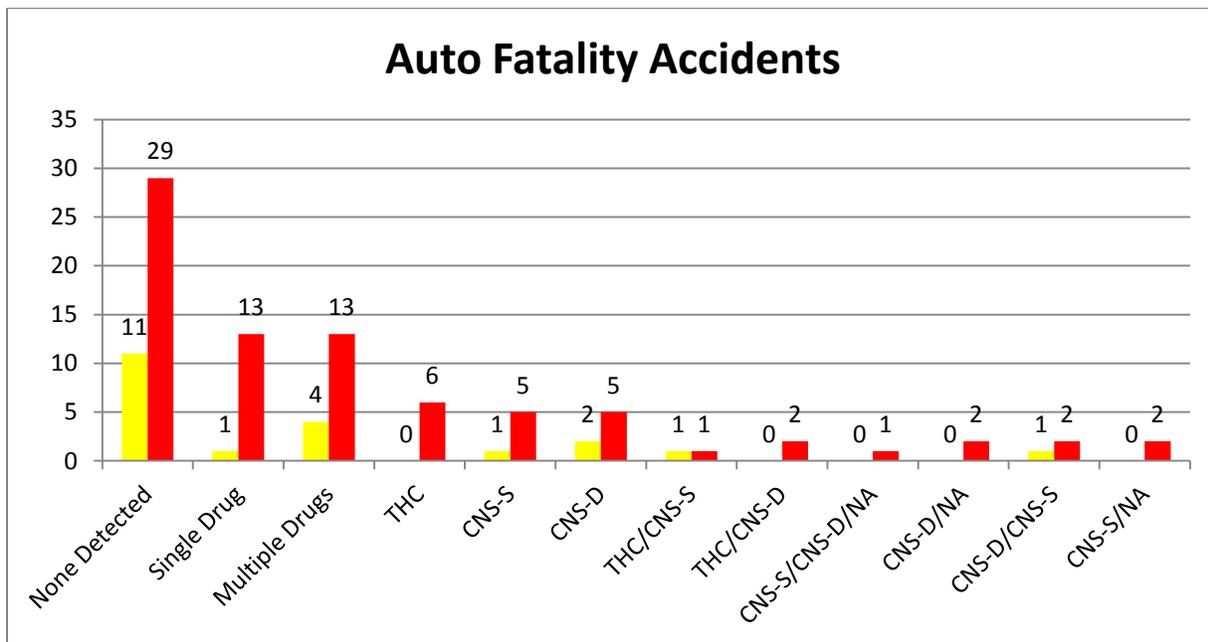
**Figure 11** illustrates adult drug results for both blood and urine associated with DUI. The pattern is the same as demonstrated with all adult toxicology (see **Figure 10**). This trend is expected since the majority of cases submitted for toxicology are DUI's.



**Figure 11 – Adult DUI Toxicology Results**

Submissions to ISPFS for alcohol, blood toxicology, and urine toxicology all decreased in FY2014; the greatest decrease was observed in the alcohol submissions. As mentioned in the alcohol section of this report, the decrease was likely due in part to the forced blood draw constitutionality concerns.

**Figure 12** shows the result categories for the 71 adult toxicology accident fatality samples submitted for toxicology in FY2014. The same number of adult toxicology accident fatality samples was analyzed in FY2013.



**Figure 12 –Toxicology Summary for Fatality Accidents, by Category**

In FY2014, 56% of the 71 cases submitted for adult fatality cases had no drugs confirmed (None Detected category). The most common drug present in drug-positive cases was carboxy-THC, followed by methamphetamine (CNS-S). ISPFS also reported primarily prescription CNS-Ds, such as citalopram, diazepam, and trazodone. Hydrocodone was the most common NA.

### **Juvenile**

Juvenile toxicology case submissions dropped significantly. Year after year, ISPFS reports carboxy-THC in the majority of juvenile cases. Carboxy-THC is an inactive metabolite of MJ.

ISPFS reported 51.7% of blood and urine samples contained at least one drug. 21% (blood and urine samples) were positive for a single drug; 30% of juvenile samples contained multiple drugs. The majority of drug combination samples contained carboxy-THC. Overall, 34% of juvenile samples contained carboxy-THC, either alone or in combination with other drugs. 48% of the total juvenile samples were negative. The high percentage of negative results may be due to limitations in ISPFS drug detection methods; ISPFS has limited capabilities to analyze toxicology samples for many new designer drugs and/or their metabolites.

Some of the most commonly reported drug combinations are carboxy-THC with a CNS-D, and carboxy-THC with a CNS-S. The stimulants were most frequently methamphetamine and the metabolite/drug amphetamine. Citalopram was the most common CNS-D drug detected in juvenile samples; doxylamine and methorphan (OTC cold medications) were the other CNS-D drugs detected. Over-the-counter (OTC) drugs are commonly abused; in other words, the drugs are taken in higher than recommended doses for the side effects. Abuse of these drugs seems to be more common in juveniles than adults. **Figure 13** shows the distribution of results in the juvenile blood and urine toxicology categories.

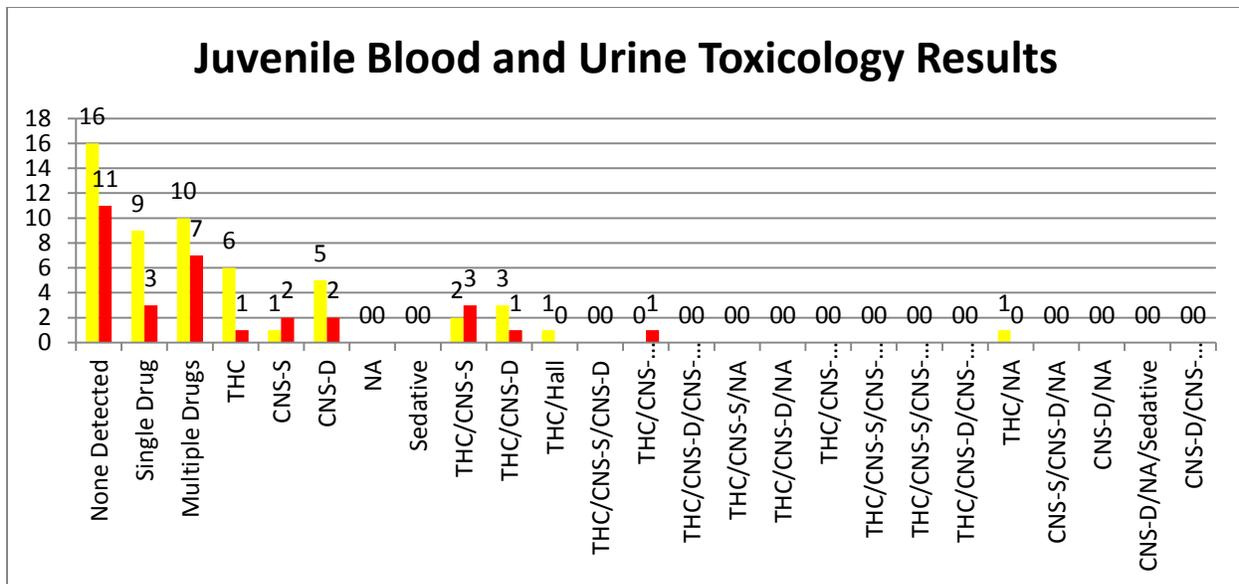


Figure 13 – Juvenile Blood and Urine Toxicology Results by Category

Figure 14 illustrates juvenile DUI results. Juvenile DUI results had a higher incidence of multiple drugs detected (61%) than the overall results for all juvenile laboratory submissions (30%). Carboxy-THC is commonly reported in juvenile DUI cases. CNS-Ss (methamphetamine/amphetamine) are reported frequently in juvenile DUI cases. Methamphetamine continues to be problematic in both adult and juvenile populations. The decrease in juvenile sample submissions may be due in part to the change in forced blood draw legal interpretation.

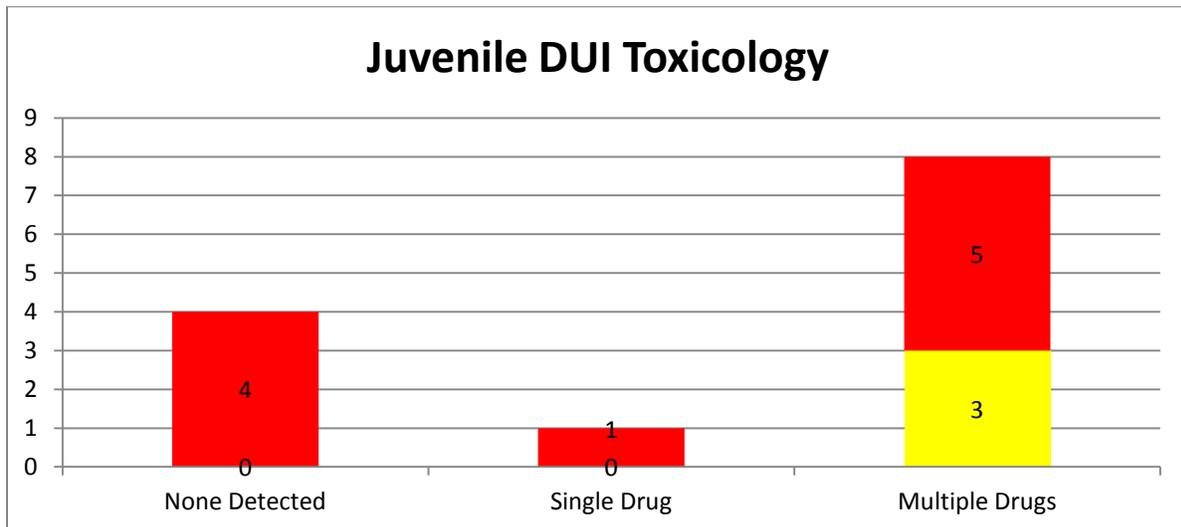


Figure 14 – Juvenile DUI Toxicology Results

Juvenile accident fatalities in which toxicology analysis was performed numbered 3 in FY2014, a four-fold decrease from the 12 analyzed in FY2013. All 3 samples resulted in no drugs detected.

**Other Offense Toxicology Results**

Cases submitted for toxicology analysis in FY2014 also included several other offenses.

**Adults:**

Count	Offense	Toxicology Results
4	Murder	<ul style="list-style-type: none"> <li>• 1 negative</li> <li>• 3 Positive—CNS-D, THC, CNS-S, and a sedative.</li> </ul>
31	Rape	<ul style="list-style-type: none"> <li>• 19 negative</li> <li>• 23 Positive –carboxy-THC and CNS-D were the most common results by far. The most frequently-seen CNS-D drugs were citalopram, diazepam, hydroxyzine, and promethazine.</li> </ul>
89	Drug Violations*	<ul style="list-style-type: none"> <li>• 2 negative</li> <li>• 87 Positive – the most common categories detected were THC or CNS-S, either alone or in combination with other drugs.</li> </ul>
25	Probation Violations**	<ul style="list-style-type: none"> <li>• 11 negative</li> <li>• 14 Positive – even distribution of THC, CNS-D, and CNS-S, most contained multiple drugs</li> </ul>
60	Other Offenses***	<ul style="list-style-type: none"> <li>• 36 negative</li> <li>• 24 Positive—mostly CNS-Ds, followed by nearly equal results of THC and CNS-Ss</li> </ul>
31	Death Investigations****	<ul style="list-style-type: none"> <li>• 15 negative</li> <li>• 16 Positive--almost even distribution of CNS-D, carboxy-THC and CNS-S</li> </ul>

**Juveniles:**

Count	Offense	Toxicology Results
4	Drug Violations*	<ul style="list-style-type: none"> <li>• All positive, all contained carboxy-THC (single and multiple drugs seen)</li> </ul>
23	Probation Violations**	<ul style="list-style-type: none"> <li>• 12 negative</li> <li>• 11 Positive--mostly even distribution of CNS-D and carboxy-THC, with some CNS-S</li> </ul>
2	Other Offenses***	<ul style="list-style-type: none"> <li>• All negative</li> </ul>
11	Rape	<ul style="list-style-type: none"> <li>• 6 negative</li> <li>• 5 Positive--CNS-D and carboxy-THC</li> </ul>

\*Includes Possession of Controlled Substances or Paraphernalia, Trafficking, Manufacturing, Delivering; \*\*Includes Juvenile, Misdemeanor, and Felony; \*\*\*Includes Arson, Aggravated Assault/Battery, Officer Involved Shooting, Injury Accidents, Injury to Child, Under the Influence in Public, Leaving the Scene, Manslaughter/Vehicular Manslaughter; \*\*\*\*Death investigations can be suicides, unattended deaths or any other death that is deemed non-criminal.

## **Top ten ISPFS reported drugs:**

1. Carboxy- THC
2. Methamphetamine (CNS-S)
3. Amphetamine (CNS-S)\*
4. Hydrocodone (NA)
5. Alprazolam (CNS-D)
6. Citalopram (CNS-D)
7. Diphenhydramine (CNS-D)
8. Oxycodone (NA)
9. Meprobamate (CNS-D)\*\*
10. Zolpidem (CNS-D)

\*Amphetamine may be a metabolite of methamphetamine.

\*\*Meprobamate may be a metabolite of carisoprodol.

## Summary

The laboratory system received 2,617 toxicology cases in FY2014, 842 cases fewer cases than in FY2013. A possible explanation of why we did not see an increase in cases this fiscal year may be due, in part, to legal issues related to forced blood draws. There was a noticeable decrease in the number of samples submitted for alcohol, and toxicology analysis to a lesser extent.

Urine toxicology case submission continued to decline in FY2014. This trend has been predicted over the last few years. We expect further decline in urine toxicology submission in FY2015, particularly as ISPFS expands its blood analytical capabilities to include some quantitative methods. ISPFS is moving toward testing only blood for DUI cases whenever possible.

ISPFS improved turnaround times in FY2014. Despite continued staffing shortages, trained scientists have worked diligently to successfully reduce backlogs. Training a toxicologist is a long and expensive process, but backlogs will continue to be problematic without new analysts and instrumentation.

In FY2013, ISPFS validated a new extraction method using Liquid Chromatography / Tandem Mass Spectrometry (LC QQQ). This method allows analysts to extract more of the benzodiazepine class compounds and “Z drugs” (zolpidem, zopiclone) from samples than the Gas Chromatograph/ Mass Spectrometry (GC/MS) methods allowed. This new method is approximately 48% more sensitive, and has decreased the number of inconclusive reports by allowing analysts to confirm hard-to-detect compounds. ISPFS successfully completed training of analysts in both laboratories as of FY2014, and this method is now offered at both the Pocatello and Coeur d’Alene laboratories.

In FY2014, ISPFS implemented a new laboratory information management system (LIMS). The LIMS will more efficiently track evidence, and provide more customer interaction. ISPFS analysts input case data and results directly into the system. The LIMS is programmed to provide performance metrics needed for agency reports. Information for the annual toxicology report should be much easier to access using the LIMS system. ISPFS also implemented a pre-log system which allows agencies to enter their own case information and track the progress of their evidence once it is received into the laboratory system. Use of LIMS has also decreased reporting times, as reports are automatically distributed to agencies immediately following report approval.

Adult toxicology trends in every category (DUI’S, fatalities, other offenses, etc.) remained fairly consistent with data from FY2013. One difference in results from FY2014 was that multiple drugs were seen more frequently than single drugs. This may be due in part to the improved analytical capabilities ISPFS has developed. The highest single drug categories reported from blood and urine testing were CNS-Ds, followed by an almost equal number of CNS-Ss and carboxy-THC (marijuana metabolite). The CNS-D category covers a wide range of drugs and drug classes, so this result was expected. The significant CNS-D drugs found in samples were alprazolam, citalopram, diphenhydramine, meprobamate, and zolpidem. CNS-S data may not be as prominent as CNS-D data because the category

covers a much smaller range of drugs than CNS-D, but CNS-S drugs remain a problem in Idaho. Methamphetamine and amphetamine were the most prominent CNS-S drugs reported by ISPFS. Methamphetamines are overwhelmingly the most common CNS-S. Methamphetamine continues to be a large problem in Idaho. Methamphetamine is second only to carboxy-THC in frequency reported by ISPFS. Marijuana and methamphetamine continue to appear in most case categories. Year after year, carboxy-THC becomes more prevalent in toxicology test results. This trend is expected to continue, particularly due to MJ legalization in the states surrounding Idaho. Perhaps educating Idaho residents more aggressively can help reduce these numbers.

For FY2015, it continues to be essential that ISPFS personnel get the funding, training, methods, and instruments needed to be able to extract synthetic cannabinoids “spice,” synthetic cathinones, other designer drugs, and metabolites of designer drugs from toxicology samples. These drugs have widely impacted our controlled substances section, and they will also impact the toxicology section when the testing can be accomplished. It is anticipated that many of our current “negative” samples are be positive for designer drugs that we are currently unable to detect. ISPFS frequently receives requests for analysis of designer drugs in toxicology samples. ISPFS scientists are working hard to reduce backlogs, but more analysts, instruments, and space (bench space and work areas) are needed to keep up with the demands of Idaho population growth and law enforcement activities.

## APPENDIX

**Non Random Juvenile Drug Testing (NJDT) Please see Idaho Statutes Title 33. Education, Chapter 2.**

**Drug Evaluation and Classification (Information below was provided by the NHTSA *Drug Evaluation and Classification Training Manual, January 2006 edition.* )** Changes have been made to help the understanding of the reader, such as Benzodiazepines have been added to anti-anxiety column in the chart and Methamphetamine has been added to list of stimulants.

### **Central Nervous System Depressants**

Central Nervous System Depressants (CNS-D) slow down the operation of the brain. They first affect those areas of the brain that control a person's conscious, voluntary actions. As dosage increases, depressants begin to affect the parts of the brain controlling the body's automatic, unconscious processes, such as heartbeat and respiration.

#### **Possible Effects of CNS Depressants:**

- ✓ Reduced social inhibitions
- ✓ Divided attention impairment
- ✓ Slowed reflexes
- ✓ Impaired judgment and concentration
- ✓ Impaired vision and coordination
- ✓ Slurred, mumbled or incoherent speech
- ✓ A wide variety of emotional effects, such as euphoria, depression, suicidal tendencies, laughing or crying for no apparent reason, etc.

Alcohol is the model for the CNS Depressant category of drugs.

Some major subcategories of CNS Depressants other than alcohol include:

- Barbiturates
- Non-Barbiturates (synthetic compounds with a variety of chemical structures)
- Anti-Anxiety Tranquilizers
- Anti-Depressants (to combat psychological depression)
- Anti-Psychotic Tranquilizers
- Combinations of the above five subcategories

### Examples of CNS Depressants

Barbiturates	Other	Anti-Anxiety Tranquilizers Benzodiazepines	Anti- Depressants	Anti-Psychotic Tranquilizers	Combinations
Amobarbital	Carisoprodol Meprobamate-M	Alprazolam	Amitriptyline Hydrochloride	Chlorpromazine	Chlordiazepoxide and Amitriptyline
Pentobarbital	Chloral Hydrate	Chlordiazepoxide	Bupropion	Droperidol	Chlordiazepoxide Hydrochloride and Clidinium Bromide
Phenobarbital	Diphenhydramine Hydrochloride	Clonazepam	Citalopram	Lithium Carbonate	Perphenazine And Amitriptyline
			Desipramine Hydrochloride	Lithium Citrate	
Secobarbital	Diphenylhydantoin Sodium	Diazepam	Doxepin Hydrochloride	Haloperidol	
			Escitalopram		
Barbital	Ethchlorvynol	Estazolam			
	Gamma- Hydroxybutyrate (GHB)	Flunitrazepam	Fluoxetine		
		Flurazepam	Imipramine		
	Glutethimide	Lorazepam	Paroxetine		
	Methaqualone	Oxazepam	Phenelzine Sulfate		
	Paraldehyde	Temazepam	Sertaline		
	Zolpidem	Triazolam	Venlafaxine		

### Central Nervous System Stimulants

Central Nervous System Stimulants (CNS-S) speed up the operation of the brain and spinal cord. It is important to emphasize that “speed up” does *not* mean “improve” or “enhance”. Some CNS Stimulants can improve cognitive functions in very low doses; however, most definitely do not make the brain work better. Rather, they cause the brain and the rest of the nervous system to work *harder*, and often to make more mistakes.

The “speeding up” caused by CNS Stimulants results in significantly increased heartbeat, respiration and blood pressure, all of which can lead to physical harm to the abuser. In addition, the stimulant user experiences nervousness, irritability and an inability to concentrate or think clearly.

## **Possible Effects of CNS Stimulants**

- ✓ Euphoria
- ✓ Anesthetic effect
- ✓ Hyperactive
- ✓ Impaired ability to perceive time and distance
- ✓ Confusion and loss of the ability to concentrate or to think clearly for any length of time

## Some major subcategories of CNS Stimulants

- Cocaine
- Amphetamines
- Methamphetamines
- Others such as phentermine, methylphenidate, ephedrine/pseudoephedrine

## **Hallucinogens**

Hallucinogens (Hall) are drugs or substances that affect a person's perception, sensation thinking, self awareness and emotions. They may also cause hallucinations. A hallucination is a sensory experience of something that does not exist outside the mind. It may involve hearing, seeing, smelling, tasting or feeling something that isn't really there. Or, it may involve distorted sensory perceptions so that things look, sound, smell, taste or feel differently from the way they actually are.

## **Possible Effects of Hallucinogens**

- ✓ Hallucination
- ✓ Perception of reality severely distorted
- ✓ Delusions
- ✓ Illusions

## **Examples of Hallucinogens**

### Naturally occurring Hallucinogens

- Peyote
- Psilocybin

## Synthetically manufactured Hallucinogens

- LSD
- MDA, MDMA, MMDA, TMA, STP, DET, DMT

## Narcotic Analgesics

There are two subcategories of Narcotic Analgesics (NA). The first subcategory consists of the Opiates. The second subcategory is the Synthetic Opioids.

## Possible Effects of Narcotic Analgesics

- ✓ “On the nod” (a semiconscious state of deep relaxation, eyelids will be droopy and the head will slump.)
- ✓ Slowed reflexes
- ✓ Slow and raspy speech
- ✓ Slow, deliberate movement
- ✓ Inability to concentrate
- ✓ Slow breathing
- ✓ Skin cool to touch
- ✓ Possible vomiting
- ✓ Itching of the face, arms, or body

## Commonly-Abused Opiates and Their Derivation From Opium

- Morphine
- Codeine
- Heroin
- Dilaudid
- Hydrocodone
- Numorphan
- Oxycodone

## Common Synthetic Opiates

- Demerol
- Methadone
- Fentanyl
- MPPP
- Darvon